Geomorphologic landscapes of the central part of Northern Eurasia

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We define geomorphologic landscape (GL) as the complex of geomorphologic, tectonic, and landscape-climatic characteristics incident to a certain territory. Such complex includes absolute height, amplitude of neotectonic movements, their gradients, the depth of erosion dissection ant its density, intensity of landslide, karst, thermokarst and glacial processes, the amount of woodlands and the degree of peat formation, precipitation, runoff, and frost-free period. The territory analyzed includes the East-European Plain, the Ural Mountains, and the Western Siberia. The 20'x30' spatial cells, described by the above mentioned 15 parameters, were clustered by k-means method with different k values. Euclidean distance was used. The results of clustering are represented as maps, where spatial distribution of different clusters, or GL, can be seen. Each GL is characterized by the set of parameter means, which determine the shape (the type) of a given GL. According to F-ratio the geomorphic parameters play the significant if not the main role in clustering. The set of cluster solutions with k=2, 5, 9, and 17 are represented.

The two plains have some common GLs only at rough division with small k values; at k=2 there are two variants of division: first – mountainous (The Urals) and plain GLs, second – GLs of the accumulative plain (the Western Siberia) and of the erosion-denudation plain. At k=5 the northernmost and the southernmost parts of the plains have common GLs: tundra GL of permafrost-erosion dissection and GL of semiarid plains with extremely low erosion and denudation correspondingly. GL of boggy lowlands with low neotectonic intensity and low erosion occupies the central part of the West Siberia while GL of neotectonic highlands with intense erosion dissection and complex of denudation processes occupies the most part of the East-European Plain. More detailed divisions (with k=9, 17 and more) show clear difference between the two plains, and at k=20 they have no common GLs. The GLs of the Western Siberia have less dispersion of parameters, i.e. they are more homogeneous, and their boundaries show stronger dependence on the latitudinal zonality than those of the East-European Plain. The latter reveals more diversity of GLs than the Western Siberia. The Urals having the GLs of the "mountain" type don't form the single area: the most part of the Middle Ural falls into the GLs of the East-European Plain types at any k value.

The tree clustering of the GLs themselves (Euclidean distances, Ward method) demonstrates their hierarchical structure, which is in good agreement with the results of k-means method. The spatial GL's boundaries are sufficiently stable to the changes of k values and to the variation of the set of parameters. The approach described can be used also as a method of typological regionalization in other geographic regions.

Age relations and volcanology of zircon bearing basalts from Eastern Saxony (Germany)

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In alkali basaltic rocks scarcely appear accessory minerals such as zircon and corundum. The origin of these mostly gem stone like mega-crystals is unknown and controversial. However, if zircon crystals present they are important tools to clarify petrogenetic questions of the host melts. Host magmas of the zircon mega-crystals are normally SiO_2 under saturated such as basanites and nephelinites.

In several localities we could observe some zircon mega-crystals and in a quarry in Saxony (eastern Germany) we collected 36 crystals up to 15 mm in size in situ from the